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Analysis of stationary filtration problems with a multivalued law in the presence of several point sources

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Abstract

We suggest a generalized statement of stationary filtration problems for an incompressible fluid obeying a multivalued filtration law with limit gradient in an arbitrary bounded nonone-dimensional domain in the presence of several point sources modeled by delta functions. The function determining the filtration law is assumed to grow linearly at infinity. The problems are stated in the form of an integral variational inequality of the second kind. We prove existence theorems and study the properties of solutions. To solve the problem, we suggest an iteration method whose each step essentially amounts to solving the Dirichlet problem for the Poisson equation. © 2008 MAIK Nauka.

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